system that the past year has shown, is the oil engine of the Diesel type, which has been brought to a high degree of perfection. And it is worthy of note, that the British Admiralty have adopted it for marine work on all pinnaces and smaller light craft. In the electrical world, the events of the year have centred largely around the electrification of suburban railways, and the advent of the electric locomotive. In this enterprise, as in the case of the steam turbine, Great Britain has led the way. The 150-ton electric locomotives now running on the Metropolitan Railway, London, have proved an unqualified success, as also have the 65-ton storage battery locomotives running in Yerkes underground electric railway, between Piccadilly and Brompton, London. Based largely upon English experiments, the electrification of the Temiskaming Railway in Canada was decided upon last summer. And during 1906, it is fully expected that work on this great enterprise in hydro-electric traction, will be commenced.

Viewed from the standpoint of the Engineer, the year 1905 has been remarkable for its forward movement in the displacement of the old types of reciprocating steam engines. And although there are lines of work in manufacture and industry, where the engine invented by James Watt will still have a place, the merest tyro in science must perceive that the passing of this type of engine for general purposes is only a matter of time.

Fraser and Chalmers, Limited, London, England, made a net profit of $140,271 for the year ending June 1905; the income was reduced, as the Allis-Chalmers Company, of Milwaukee, Wis., U. S. A., passed its preference dividend, **having spent its profits in laying down plant for the economical manufacture of electrical machinery, steam turbines, gas engines, etc., to meet the demands of the new era.**

Our advice to Canadian Engineering firms generally is, "Go ye and do likewise."

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Negative Side of Mechanical Engineering.

In the technical world, no yearly document is looked forward to with greater interest by responsible Engineers, than the annual report of the British Engine, Boiler, and Electrical Insurance Company, Limited, edited by Mr. Michael Longridge, whose name as a critic in constructive Engineering is synonymous with competence and thoroughness. In the last annual report a startling feature is the record of high percentage of failure of electric dynamos and motors due to old age or deterioration. One out of every twelve dynamos insured, broke down during the year, and one out of every 9.3 motors. The application of electricity to driving in factories is so recent, that in the order of things, none of these can yet be old, yet the facts are, that 38 per cent. of the dynamos, and 25 per cent. of the motors which failed, were worn out. Side by side with these breakdowns, is the recorded failure of a reciprocating steam engine, which had been running faithfully for some 70 years! Another line of experience is in the failure after failure of steam engines, caused by overload. Designed for 60 lbs. pressure, they have been subjected to pressures of 130 lbs., and more, in order to meet the quickened speed of machines due to keen competition and the introduction of higher grade cutting tools. The flat surfaces intended to carry 50 or 60 lbs. will not stand 160 lbs., hence failure; followed by characteristic English patching, and consequently repeated breakdowns. "Engineering," (London), commenting on this dangerous practice—especially in the matter of boiler failures for like cause—is disposed to question the honesty and integrity of builders who undertake these repairs. The report shows that one boiler was actually covered with patches put on with bolts, and made tight with cement! Mr. Longridge insists that the headers of Babcock and Wilcox boilers should be removed annually for examination. He cites a case in proof of this need. A boiler was examined in 1902, when only a few doors were removed at selected points. In 1903 a thorough inspection was made, and serious corrosion was discovered at the places where the outside dogs or caps were bedded. In 1904 this oxidation had increased so rapidly that the metal was only ⅛" thick in places. The report bristles with important facts like those indicated, accompanied by suggested remedies. It is interesting to note that most of the failures in prime movers are in slow-speed engines; modern high-speed engine failures being conspicuous by their absence. Valuable object lessons are presented in the shape of defective valve gear, and connecting rod bolts, with a luminous and profitable discussion of fibre stress and reliable factors of safety. And not to be despised are the recorded trial tests of the celebrated Cole, Marchant, and Morley marine type compound engine, (258 H.P.), operating with superheated steam, at a steam consumption of 8.682 lbs. per hour, which data are supplemented by some critical inductive reasoning on the ultimate value of superheated steam; and these invaluable steam engine data are followed by scientifically tabulated data on the trial tests of effective work done by a 634 H.P. triple cylinder Diesel oil engine, which developed 163.3 horse-power, with an oil consumption of 0.28 lbs. of oil per horse-power hour, converting the same into a mechanical equivalent of 45 per cent. of the total heat value of the fuel. Lack of space will not permit a more extended notice of the contents of this invaluable report, but in laying it down, we have no hesitation in declaring our conviction, that it is the most important *practical* document issued in the domain of Mechanical Engineering during the year 1905.

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Rocks Ahead in Structural Engineering.

During the past year, wrought iron, stone and concrete, have been coming into increasing favor, owing to the alleged rapid decay of steel structures through corrosion. Certain of the great railway corporations in the United States have firmly declared against steel-built bridges, etc., and in favor of the erection of stone and concrete structures, wherever possible. Farmers out West say that their wire fences are done at the end of *three* years, whereas their old material used to last *thirty* years. The rapid deterioration of steel wire nails and steel plates, coated with tin and used for roofing; steel boiler tubes, etc., is a matter of notoriety. We were astonished to notice in an Ottawa factory building a week or two ago, concrete and wood applied, where a few years back, steel sections would have been used almost exclusively. It is quite evident, that unless some process is discovered of thwarting the destructive action of corrosion on exposed steel structures, a serious check will be given to the thriving industry in steel manufacture. The Canadian Government has wisely undertaken at Sault Ste. Marie to try and utilize our refractory ores for the manufacture of iron and steel; why not supplement this by scientific experimentation on the best method of arresting the oxidation and corrosion of steel after it is made and applied?